UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new non-provisional applications under 37CFR§1.53(b))

Attorney Docket No.	KLR:7146.048
First Inventor or Application Identifier	Qian et al.
Title	A METHOD OF CREATING A SEMANTIC VIDEO SUMMARY USING INFORMATION FROM SECONDARY SOURCES
Express Mail Label No.	EL399605839US

APPLICATION ELEMENTS
See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Assistant Commissioner for Patents
Box Patent Application
Washington, D.C. 20231

1. ☒ *Fee Transmittal Form (e.g. PTO/SB/17)
   (Submit an original and a duplicate for fee processing)

2. ☒ Specification   Total pages [9]

   (preferred arrangement set forth below)
   - Descriptive Title of the Invention
   - Cross References to Related Applications
   - Statement Regarding Federally Sponsored Research
   - Reference to Microfiche Appendix
   - Background of the Invention
   - Brief Summary of the Invention
   - Brief Description of the Drawings (if filed)
   - Detailed Description
   - Claim(s)
   - Abstract of the Disclosure

3. ☒ Drawing(s) (35 USC 113)   [Total Pages [2]

4. Oath or Declaration   [Total Pages [2]

   a. ☒ Newly executed (original or copy)

   b. ☐ Copy from a prior application (37 CFR §1.63(d))
      (for continuation/divisional with Box 16 completed)

      I. ☐ Deletion of Inventor(s)
         Signed statement attached deleting inventor(s)
         named in the prior application,
         see 37 CFR §§1.53(d)(2) and 1.33(b)

* Note for Items 1 & 13: In order to be entitled to pay small entity fees, a small entity statement is required (37 CFR §1.27), except if one filed in a prior application is relied upon (37 CFR §1.28)

5. ☐ Microfiche Computer Program (Appendix)

6. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
   a. ☐ Computer readable copy
   b. ☐ Paper copy (identical to computer copy)
   c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. ☒ Assignment Papers (cover sheet & document(s))

8. ☒ 37 CFR §3.73(b) Statement   ☒ Power of Attorney
   when there is an assignee

9. ☐ English translation document (if applicable)

10. ☐ Information Disclosure Statement (IDS) /PTO 1449   ☐ Copies of IDS Citations

11. ☐ Preliminary Amendment

12. ☒ Return Receipt Postcard (MPEP 503)
   (should be specifically itemized)

13. ☐ *Small Entity Statements (PTO/sb/09-12)   ☐ Statement filed in prior application. Status still proper and desired.

14. ☐ Certified Copy of Priority Document(s)
   (if foreign priority is claimed)

15. ☒ Other Check in the amount of $878

16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment
   ☐Continuation   ☐ Divisional   ☐ Continuation-in-part (CIP)   of prior application filed _____
   Prior application information: Examiner _____
   For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS

☐ Customer Number or Bar Code Label   (Insert customer number or attach bar code label here)   or ☒ Correspondence address below

Name	Kevin L. Russell Chernoff Vilhauer McClung & Stenzel
Address	601 SW Second Ave., Suite 1600
City	Portland
State	OR
Zip Code	97204
Country	US
Telephone	(503) 227-5631
FAX	(503) 228-4373

Name (print type)	Kevin L. Russell	Registration No. (Attorney/Agent)	38,292
Signature		Date	December 6, 1999

A METHOD OF CREATING A SEMANTIC VIDEO SUMMARY
USING INFORMATION FROM SECONDARY SOURCES

5   BACKGROUND OF THE INVENTION

The present invention relates to a method of summarizing or abstracting video and, more particularly, a method for using information related to video obtained from a source other than the video to create an audio-video semantic summary of video.

10   The dramatic increase in the quantity of available video, a trend which is expected to continue or accelerate, has increased the need for an automated means of summarizing video. A summary of a video could be viewed as a preview to, or in lieu of, viewing the complete, unabridged video. Summarization could also be used as a basis for filtering large quantities of available video to

15   create a video abstraction related to a specific subject of interest. However, to be most beneficial the summary or abstraction should be semantically significant, capturing major events and meaning from the video.

There are three broad classes of techniques for creating video summaries. A first class of techniques produces a linear summary of a video sequence. A

20   linear summary comprises a collection of key frames extracted from the video. Groups of similar frames or shots are located in the video sequence, and one or more key frames are selected from each shot to represent the content of the shot. Shot boundary detection and selection of key frames within a shot are based on lower level video analysis techniques, such as frame to frame variation in color

25   distribution or temporal positioning of a frame in a shot. While the creation of linear summaries can be automated, the extraction of a linear summary is not event driven and may only capture a rough abstraction of the video. Linear summaries are useful for video sequences where events are not well defined, such as home video, but are not well suited to producing meaningful summaries of

30   videos containing well defined events, such as videos of sporting events.

A second summary extraction technique produces a video story board. The story board is a graphic presentation of the video comprising a number of nodes and edges. Nodes are created by grouping shots usually on the basis of some low level visual characteristic, such as a color histogram. The edges

5   describe relationships between the nodes and are created by human interaction with the summarizing system. While story boarding can produce meaningful summaries, it relies on human intervention to do so.

A third summary extraction technique involves the creation of semantic video summaries which requires an understanding of the events in the video and,

10   in many cases, some expertise of the domain or subject area portrayed by the video. Obtaining this understanding and expertise through automated means has, heretofore, been problematic. Smith et al., VIDEO SKIMMING FOR QUICK BROWSING BASED ON AUDIO AND IMAGE CHARACTERIZATION, Carnegie-Mellon University Tech Report, CMU-CS-95-186, 1995, utilizes detection of

15   keywords in the audio track or closed captioning accompanying a video as a basis for locating meaningful video segments. However, it is difficult to select appropriate keywords and the selected keywords may be uttered many times as part of some general commentary related to the subject of the video without necessarily signaling the presence of corresponding meaningful visual images.

20   What is desired, therefore, is a method of creating meaningful event driven video summaries that minimizes the necessity for human intervention in the summarizing process.

SUMMARY OF THE INVENTION

25   In a first aspect, the present invention overcomes the aforementioned drawbacks of the prior art by providing a method of creating a semantic summary of a video comprising the steps of identifying a domain of the video; using the domain identity to locate information related to the video at a source other than the video; extracting data from the information; and extracting content from the

30   video related to the data. The domain or sphere of activity of the video can be

-2-

identified from an electronic programming guide or other indexing means. With the domain identity known, the summarizing system can link to a worldwide web site or an electronic programming guide containing statistics or other summary information about events of the video. In this way, the system can obtain the high

5   level knowledge about the progress of events in the video to permit the system to identify content corresponding to significant events. Thus, although the summarizing information was created for other purposes it can be used to assemble a semantic summary of the video.

In a second aspect of the invention, a method of abstracting video is

10   provided comprising the steps of locating an index of the video; identifying a domain of a video abstraction; using the domain identity to identify in the index video for inclusion in the abstraction; and extracting the identified video. An index of a video collection is located in an electronic programming guide, on the worldwide web or otherwise. When the domain of the particular abstraction is

15   identified, the domain's identity can be used as a basis for searching the collection for video relevant to the desired abstraction.

The method of the present invention provides the high level domain knowledge necessary for creating semantic summaries and abstractions by locating the knowledge for event recognition and detection in existing sources

20   without the need for additional human intervention.

The foregoing and other objectives, features and advantages of the invention will be more readily understood upon consideration of the following detailed description of the invention, taken in conjunction with the accompanying drawings.

25

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of the summarization and abstraction system of the present invention.

FIG. 2 is an exemplary worldwide web page containing information related

30   to a sporting event.

-3-

FIG. 3 is an exemplary video index containing programming information related to headline news.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

5   Creation of a semantically significant summary of video footage generally requires the ability to recognize and detect events and objects in the visual images, together with some high-level knowledge of the domain or sphere of activity of the video upon which to base the inference of the occurrence of an event in the video. For example, providing a meaningful summary of a sporting

10   event requires knowledge concerning the progress of events in the game to permit the summarizing system to detect significant plays, such as scoring attempts, and the capability to locate and extract a visual representation of the detected event. While computer vision techniques are increasingly capable of object recognition and detection, event recognition requires a higher level of understanding of the

15   progress of events than computers have been capable of achieving by processing video.

The inability of automated techniques to develop a sufficient understanding of events in the domain of a video, in such a manner as to enable detection of events, is a significant problem in automating the creation of semantically

20   significant video summaries. While this remains a problem, the present inventors realized that there are automatically accessible sources of information separate from the video itself that index or summarize events in the domain of many videos. Further, even though this information was created for other purposes, it may be used for creating semantic summaries or abstractions of video. The method of

25   creating a semantic video summary of the present invention uses available information from sources other than the video, such as world-wide-web sites, an electronic programming guide, or other sources, to aid in event inference and detection to create meaningful summaries.

Referring to FIG. 1, the summarization method of the present invention first

30   identifies a domain 1 or sphere of activity in which a semantic summary system 2

-4-

will operate. Higher level domains include sports, news, movies, etc. These domains may be further divided into more specific subject areas, such as basketball, soccer, football, etc. The identity of the domain of a broadcast video may be extracted from an electronic programming guide that lists television

5   programming and content for viewers. Other indexing systems related to video may also be used to identify the domain. Based on the identification of the domain, the summarizing system 2 links to a secondary source of information 4, such as a worldwide web site, which includes statistical, summary, or other indexing information related to the events which are the subject of the video 6.

10   Many worldwide web sites include statistics, summary information, or commentary related to sports activities, news, or movies. Much of the information at worldwide web sites is in the form of textual summaries. Using optical character recognition, parsing of hypertext markup language (HTML) code or other known techniques, the summarization system 2 extracts information that is semantically significant to

15   the video 6.

For example, FIG. 2 illustrates an exemplary textual summary related to a soccer game posted on a worldwide web site. From such a textual summary the video summarization system 2 can extract information, such as names and times of events, and identification of subjects (e.g., names and uniform numbers of

20   players). Using the data obtained from the summary, the summarization system 2 can pinpoint a number of shots from the video 6 around the times of the scoring events for inclusion in the video summary 8. On the other hand, the system might use object detection and optical character recognition to locate the specific players to further pinpoint video content corresponding to the events identified in

25   the textual summary described at the secondary source of information 4. The summarization system 2 permits a user to enter preferences 10 related to the summary 8 to be created. For example, a user might instruct the system to search out events related to a particular individual or subject.

The summarization system 2 can also be used to create an abstraction of a

30   video collection. Utilizing indexing information for the video collection extracted

-5-

from the secondary source of information 4 and a domain for the video abstraction 1 provided by a user, the summarization system 2 can search video footage 6 that may be stored in a home file system or filter broadcast video to identify portions of the video matching events or subjects in the requested domain.

5 For example, the summarization system 2 can extract information related to source, story title, names of subjects, or times of events from a site summarizing televised news programming.

FIG. 3 illustrates an exemplary textural index of broadcast news events. If the user wishes to review video footage related to "DuPont," a keyword search by

10 the summarization system of such a news index at a worldwide web site or in an electronic programming guide would locate two relevant news events. From this information the system 2 can direct the recording of the appropriate videos for an abstraction 8 of the news programming for eventual presentation to the viewer. Existing audio or visual information from a secondary source 4, such as a web

15 site, may also be down loaded from the secondary source 4 and matched to the video segments obtained from broadcast media.

All the references cited herein are incorporated by reference.

The terms and expressions that have been employed in the foregoing specification are used as terms of description and not of limitation, and there is no

20 intention, in the use of such terms and expressions, of excluding equivalents of the features shown and described or portions thereof, it being recognized that the scope of the invention is defined and limited only by the claims that follow.

What is claimed is:

1. A method of creating a semantic summary of a video comprising the steps of:

    (a) identifying a domain of said video;

5   (b) using said domain to locate information related to said video at a source other than said video;

    (c) extracting a datum related to a semantic event from said information; and

    (d) extracting content related to said semantic event from said video related

10   to said datum.

2. The method of claim 1 wherein said information is a textual summary of events.

15 3. The method of claim 1 wherein said information is included in a worldwide web site.

4. The method of claim 1 wherein said information is included in an electronic programming guide.

20

5. The method of claim 1 wherein said domain is identified from an electronic programming guide.

6. The method of claim 1 further comprising the step of selection of said datum

25   by a user of said summary.

7. A method of abstracting video comprising the steps of:

    (a) locating an index of said video from a source external to said video;

    (b) identifying a domain of said video abstraction;

30   (c) using said domain to identify in said index video for inclusion in said

abstraction; and

(d) extracting said identified video.

8. The method of claim 7 wherein said index is included in a worldwide web site.

9. The method of claim 7 wherein said index is included in an electronic programming guide.

10. The method of claim 7 further comprising the step of identification of said domain by a user of said abstraction.

11. A method of creating a semantic summary of a video comprising the steps of:

(a) identifying a domain of said video;

(b) using said domain to locate a textual summary of said video;

(c) extracting a datum related to a semantic event relevant to said video summary from said textual summary;

(d) locating content in said video corresponding to said datum; and

(e) extracting said content related to said semantic event corresponding to said datum from said video for inclusion in said summary.

12. A method of abstracting video comprising the steps of:

(a) locating an index of said video in at least one of a worldwide web site and a programming guide;

(b) identification of a domain of said video abstraction by a user of said abstraction;

(c) using said domain to select in said index video for inclusion in said abstraction; and

(d) extracting said identified video.

ABSTRACT OF THE DISCLOSURE

5   Creating semantic summaries and abstractions of video requires high level knowledge of the domain of the video. Obtaining this high level information without human intervention is problematic. A method of producing video summaries and abstractions is provided where high level knowledge necessary for meaningful summarization is obtained from existing sources such as the

10   worldwide web or an electronic programming guide. With this information, the summarization system can automatically identify significant events or subjects and extract video related to these events or subjects.
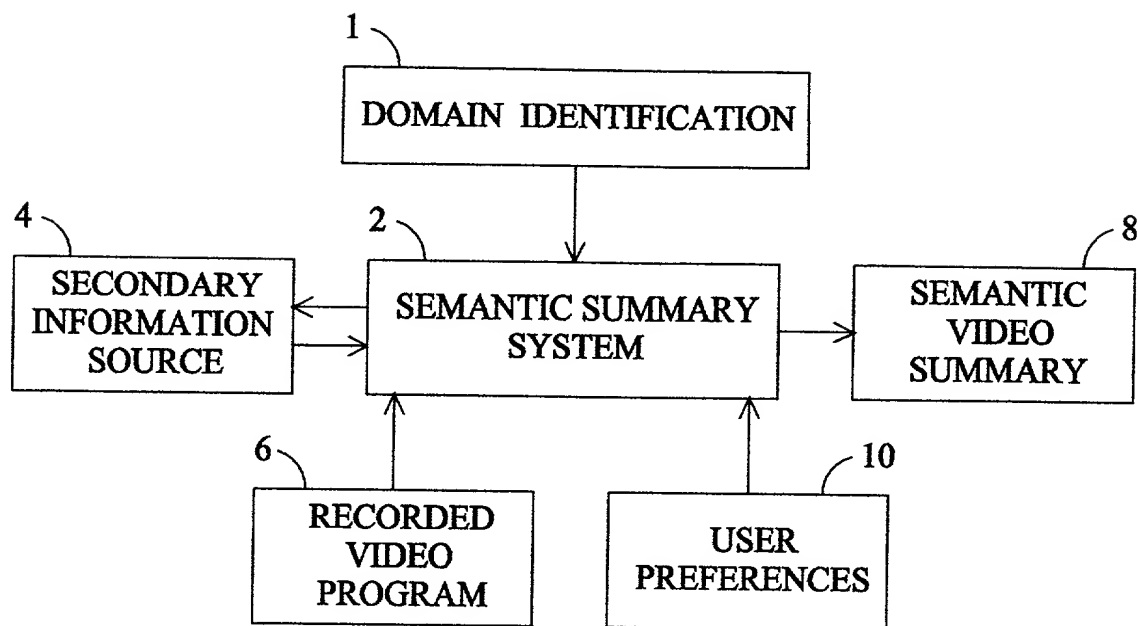
DOMAIN IDENTIFICATION

1

4

SECONDARY INFORMATION SOURCE

2

SEMANTIC SUMMARY SYSTEM

8

SEMANTIC VIDEO SUMMARY

6

RECORDED VIDEO PROGRAM

10

USER PREFERENCES

FIG. 1

Box Score: NY/NJ MetroStars at Miami Fusion			
Posted: Sat August 15, 1998 at 7:23 p.m. EDT			
	1	2	F
METROSTARS	0	1	1
MIAMI FUSION	0	3	3
Scoring Summary:			
MIA -- Serna (Boyce)		66	
MET -- Duhaney, M. (Sorber)		84	
MIA -- Serna (Valderrama, Vargas)		89	
MIA -- Valderrama (Vargas)		90	

FIG. 2

Latest Market News

- TOKYO STOCKS - Factors to watch - August 17 - Sun 7:32 pm
- WALL ST WEEK AHEAD - Clinton sideshow to global woes - Sun 6:24pm
- IPO VIEW - Delay may hurt tech deals this week - Sun 6:23pm
- DAOU accounting raises question - Barrons - Sun 5:53pm
- Analyst sees Conoco as a good for Elf and DuPont - Sun 5:36pm
- TransFinancial fends off takeover bid - Sun 4:17pm
- Cabot Industrial Trust files for offering - Sun 3:19pm
- DuPont declines comment on Conoco report - Sun 2:27pm
- Global turmoil seen keeping U.S. rates steady - Sun 11:55am
- Clinton expected to admit to improper relationship - Sun 10:23am
- Riding the Toronto market not for weak hearted - Sun 10:08am

FIG. 3

DECLARATION AND POWER OF ATTORNEY

As the below named inventors, we hereby declare that:

Our residence, post office address and citizenship are as stated below next to our names.

We believe that we are the original inventors of the subject matter which is claimed and for which a patent is sought on the invention entitled:

A METHOD OF CREATING SEMANTIC VIDEO SUMMARY USING INFORMATION FROM SECONDARY SOURCES

the specification of which

[X]   is attached hereto.
     was filed on _____ as
[ ]   Application Serial No. _____
     and was amended on _____.
                    (if applicable)

We hereby state that we have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment referred to above.

We acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56.

We hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

                                              Priority
                                            Claimed

_____ _____ _____ [ ] Yes [ ] No
  (Number)   (Country)   (Day/Month/Year Filed)

_____ _____ _____ [ ] Yes [ ] No
  (Number)   (Country)   (Day/Month/Year Filed)

We hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below.

_____ _____
(Application Serial No.)   (Filing Date)

_____ _____
(Application Serial No.)   (Filing Date)

We hereby claim the benefit under Title 35, United States Code, § 120, of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, we acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Ser. No.)	(Filing Date)	(Status) (patented, pending, abandoned)

We hereby appoint Jacob E. Vilhauer, Jr., Reg. No. 24,885, Charles D. McClung, Reg. No. 26,568, Dennis E. Stenzel, Reg. No. 28,763, Donald B. Haslett, Reg. No. 28,855, William O. Geny, Reg. No. 27,444, J. Peter Staples, Reg. No. 30,690, Kevin L. Russell, Reg. No. 38,292, Bruce W. DeKock, Reg. No. 40,585, Nancy J. Moriarty, Reg. No. 40,733, Timothy E. Siegel, Reg. No. 37,442 and Timothy A. Long, Reg. No. 28,876, all of the firm of Chernoff, Vilhauer, McClung & Stenzel, LLP, 1600 ODS Tower, 601 S.W. Second Avenue, Portland, Oregon 97204, telephone number 503-227-5631, our attorneys, jointly and individually, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: 11/29/99

Full name of sole inventor
Residence
Citizenship
Post Office Address

Richard Qian
Camas, WA
China
2844 NW 44th Avenue
Camas, WA 98607-8318

Dated:_____

Full name of sole inventor
Residence
Citizenship
Post Office Address

Peter J.L. Van Beek
Vancouver, Washington
Netherlands
12800 NE 4th St, Apt. LL113
Vancouver, WA 98684

We hereby claim the benefit under Title 35, United States Code, § 120, of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, we acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Ser. No.)	(Filing Date)	(Status) (patented, pending, abandoned)

We hereby appoint Jacob E. Vilhauer, Jr., Reg. No. 24,885, Charles D. McClung, Reg. No. 26,568, Dennis E. Stenzel, Reg. No. 28,763, Donald B. Haslett, Reg. No. 28,855, William O. Geny, Reg. No. 27,444, J. Peter Staples, Reg. No. 30,690, Kevin L. Russell, Reg. No. 38,292, Bruce W. DeKock, Reg. No. 40,585, Nancy J. Moriarty, Reg. No. 40,733, Timothy E. Siegel, Reg. No. 37,442 and Timothy A. Long, Reg. No. 28,876, all of the firm of Chernoff, Vilhauer, McClung & Stenzel, LLP, 1600 ODS Tower, 601 S.W. Second Avenue, Portland, Oregon 97204, telephone number 503-227-5631, our attorneys, jointly and individually, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.
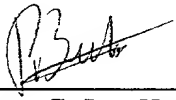
Dated:_____

Full name of sole inventor   Richard Qian
Residence   Camas, WA
Citizenship   China
Post Office Address   2844 NW 44th Avenue
                                    Camas, WA 98607-8318

Dated: _Oct. 27, 1999_____

Full name of sole inventor   Peter J.L. Van Beek
Residence   Vancouver, Washington
Citizenship   Netherlands
Post Office Address   12800 NE 4th St, Apt. LL113
                                    Vancouver, WA 98684

DECLARATION AND POWER OF ATTORNEY

As the below named inventors, we hereby declare that:

Our residence, post office address and citizenship are as stated below next to our names.

We believe that we are the original inventors of the subject matter which is claimed and for which a patent is sought on the invention entitled:

A METHOD OF CREATING SEMANTIC VIDEO SUMMARY USING INFORMATION FROM SECONDARY SOURCES

the specification of which

[X]   is attached hereto.
      was filed on _____ as
[ ]   Application Serial No. _____
      and was amended on _____.
                          (if applicable)

We hereby state that we have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment referred to above.

We acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56.

We hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority
Claimed

_____ _____ _____ [ ] Yes [ ] No
  (Number)   (Country)   (Day/Month/Year Filed)

_____ _____ _____ [ ] Yes [ ] No
  (Number)   (Country)   (Day/Month/Year Filed)

We hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below.

_____   _____
(Application Serial No.)   (Filing Date)

_____   _____
(Application Serial No.)   (Filing Date)

We hereby claim the benefit under Title 35, United States Code, § 120, of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, we acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Ser. No.)	(Filing Date)	(Status) (patented, pending, abandoned)

We hereby appoint Jacob E. Vilhauer, Jr., Reg. No. 24,885, Charles D. McClung, Reg. No. 26,568, Dennis E. Stenzel, Reg. No. 28,763, Donald B. Haslett, Reg. No. 28,855, William O. Geny, Reg. No. 27,444, J. Peter Staples, Reg. No. 30,690, Kevin L. Russell, Reg. No. 38,292, Bruce W. DeKock, Reg. No. 40,585, Nancy J. Moriarty, Reg. No. 40,733, Timothy E. Siegel, Reg. No. 37,442 and Timothy A. Long, Reg. No. 28,876, all of the firm of Chernoff, Vilhauer, McClung & Stenzel, LLP, 1600 ODS Tower, 601 S.W. Second Avenue, Portland, Oregon 97204, telephone number 503-227-5631, our attorneys, jointly and individually, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: **11/29/99**
Full name of sole inventor
Residence
Citizenship
Post Office Address

Richard Qian
Camas, WA
China
2844 NW 44th Avenue
Camas, WA 98607-8318

Dated:
Full name of sole inventor
Residence
Citizenship
Post Office Address

Peter J.L. Van Beek
Vancouver, Washington
Netherlands
12800 NE 4th St, Apt. LL113
Vancouver, WA 98684

We hereby claim the benefit under Title 35, United States Code, § 120, of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, we acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

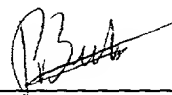| (Application Ser. No.)	(Filing Date)	(Status) (patented, pending, abandoned)

We hereby appoint Jacob E. Vilhauer, Jr., Reg. No. 24,885, Charles D. McClung, Reg. No. 26,568, Dennis E. Stenzel, Reg. No. 28,763, Donald B. Haslett, Reg. No. 28,855, William O. Geny, Reg. No. 27,444, J. Peter Staples, Reg. No. 30,690, Kevin L. Russell, Reg. No. 38,292, Bruce W. DeKock, Reg. No. 40,585, Nancy J. Moriarty, Reg. No. 40,733, Timothy E. Siegel, Reg. No. 37,442 and Timothy A. Long, Reg. No. 28,876, all of the firm of Chernoff, Vilhauer, McClung & Stenzel, LLP, 1600 ODS Tower, 601 S.W. Second Avenue, Portland, Oregon 97204, telephone number 503-227-5631, our attorneys, jointly and individually, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated:_____
Full name of sole inventor   Richard Qian
Residence   Camas, WA
Citizenship   China
Post Office Address   2844 NW 44th Avenue
                               Camas, WA 98607-8318

Dated: _Oct. 27, 1999_
Full name of sole inventor   Peter J.L. Van Beek
Residence   Vancouver, Washington
Citizenship   Netherlands
Post Office Address   12800 NE 4th St, Apt. LL113
                               Vancouver, WA 98684

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE UNDER 37 CFR §3.73(b)

Applicant   : <u>Richard Qian and Peter J.L. Van Beek</u>

Application No: _____ Filed: <u>Concurrently herewith</u>

Title   : <u>A METHOD OF CREATING SEMANTIC VIDEO SUMMARY USING</u>
<u>INFORMATION FROM SECONDARY SOURCES</u>

<u>Sharp Laboratories of America, Inc.</u> (Assignee)a <u>Washington corporation</u>
(Type of Assignee, e.g., corporation, partnership, university, government
agency, etc.)certifies that it is the assignee of the entire right, title and
interest in the patent application identified above by virtue of either:

A. [ ]   An assignment from the inventor(s) of the patent application
identified above. The assignment was recorded in the Patent and
Trademark Office at Reel _____, Frame _____, or for which a
copy thereof is attached.

OR

B. [ ]   A chain of title from the inventor(s), of the patent application
identified above, to the current assignee as shown below:

    1. From: _____ To: _____
       The document was recorded in the Patent and Trademark Office at Reel
_____, Frame _____, or for which a copy is attached.

    2. From: _____ To: _____
       The document was recorded in the Patent and Trademark Office at Reel
_____, Frame _____, or for which a copy is attached.

  [ ] Additional documents in the chain of title are listed on a supplemental
sheet.

    [x]   Copies of assignments or other documents in the chain of title
are attached. (Where one or more of the documents is
unrecorded.)

     The undersigned has reviewed all the documents in the chain of title of
the patent application identified above and, to the best of undersigned's
knowledge and belief, title is in the assignee identified above.

     The undersigned (whose title is supplied below) is empowered to sign
this Certificate on behalf of the assignee.

     I hereby declare that all statements made herein of my own knowledge are
true, and that all statements made on information and belief are believed to
be true; and further, that these statements are made with the knowledge that
willful false statements, and the like so made, are punishable by fine or
imprisonment, or both, under Section 1001, Title 18 of the United States Code,
and that such willful false statements may jeopardize the validity of the
application or any patent issuing thereon.

Date   : <u>December 6, 1999</u>

Name   : <u>Kevin L. Russell</u>

Title   : <u>Attorney for the Assignee (a copy of the Power of Attorney is</u>
<u>attached</u>

Signature: _____

Chernoff, Vilhauer, McClung & Stenzel, LLP
1600 ODS Tower
602 SW Second Avenue
Portland, Oregon 97204
Tel: (503) 227-5631